

Report of the Crowdsourced Bathymetry Working Group to IRCC11

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CSB Working Group Task

The CSBWG is tasked by the IRCC to develop a draft IHO publication on policy for trusted crowdsourced bathymetry (CSB).

This document will provide guidelines on the collection and assessment of CSB data for inclusion in the global bathymetric data set which is maintained in the IHO Data Centre for Digital Bathymetry (DCDB).



Progress on IRCC Action Item

IRCC10:

- Decision 20: To endorse the CSB Guidance Document.
- Action 16: Chair to submit the CSB Guidance Document to the Council for endorsement and subsequent approval by MS (deadline: C-2).

B-12 Edition 1.0.0 submitted to C-2.

Subsequent changes required by C-2 incorporated into Edition 2.0.1 for approval by IHO Member States under IHO CL 11/2019 dated 25 January 2019.

35 Member States approved the adoption of B-12 out of 38 replies.

A follow-up IHO CL is being prepared with the full details, including responses to the comments provided.



Guidance on Crowdsourced
Bathymetry

To access the document:

https://www.iho.int/srv1/index.php?option=com_content&view=article&id=635&Itemid=988&lang=en



CSB Working Group 6th Meeting

- Chair (Jennifer Jencks, USA) and Vice-Chair (Serge Gosselin, Canada) of CSBWG
- Representatives from four Member States
 - Canada, Norway, UK and USA
- Observers and expert contributors from the World Ocean Council, the NF-GEBCO Seabed 2030 Project, ONE Data Technology Co, Dongseo University and Farsounder INC
- Remote participation by: Denmark, GMATEK, Sea-ID, ChartWorld/SevenCs and TeamSurv
- Assistant Director David Wyatt represented the IHO Secretariat

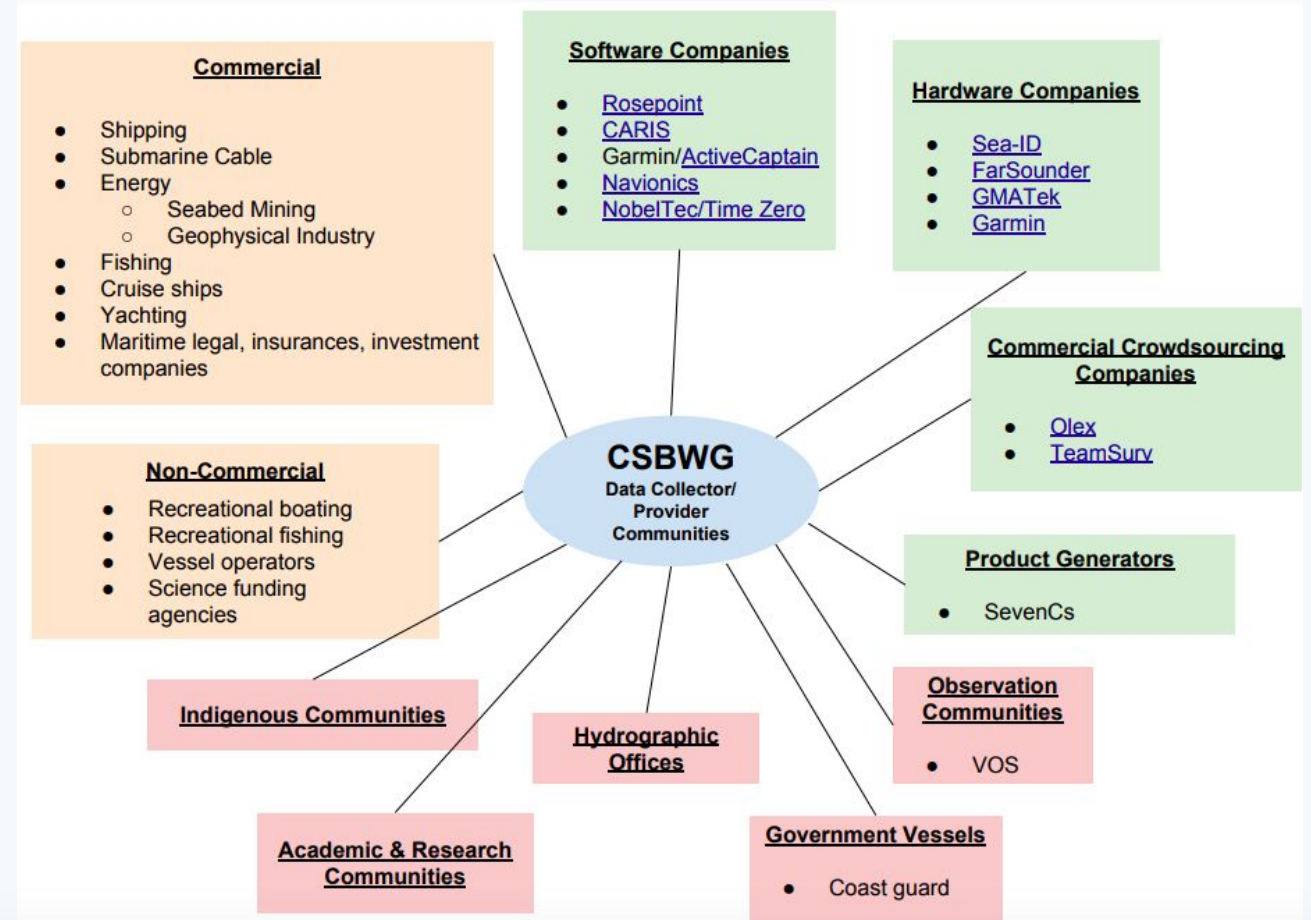


Hosted by the NOAA's National Centers for Environmental Information, on 19-21 June 2018



CSB Working Group 6th Meeting

- Briefly reviewed the final draft version of the B-12 Guidelines which was presented to the IRCC10.
- Updates on activities on a number of ongoing CSB-related projects.
- Discussed future tasks approved by IRCC10 as a result of the adoption of the revisions to the ToRs of the CSBWG.
- Focused on **future outreach strategies** for which various sectors were identified and 5 headline topics (need, how, what, incentives and benefits) were defined to increase contributions and participation - these would be further developed at the next meeting.



Hosted by the NOAA's National Centers for Environmental Information, on 19-21 June 2018



CSB Industry Workshop

Goal: To showcase a variety of current industry CSB participants and discuss the potential for future collaborations to advance the IHO CSB Initiative.

Key Objectives:

- Raise awareness of corporate leadership/opportunities to stimulate action for the collection and sharing of CSB data;
- Discuss CSB acquisition methods/procedures/opportunities;
- Information sharing on transit/CSB data acquisition and exchange formats and protocols;
- Determine tools, methods and protocols to leverage/stimulate a generic participative approach for CSB data collection
- Develop synergies with global initiatives including Seabed 2030

Representatives from: CIDCO, Da Gama Maritime, EGS Survey (representing ICPC), ECC, ESRI, FarSounder, Fugro, GMATEK, Hypack, Olex, Secunda, SevenCs/ChartWorld and Teledyne CARIS



Hosted by the Canadian Hydrographic Service, Quebec City, Canada, on 12-13, February 2019



CSB Industry Workshop

- Industry reps. were given an Initiative overview, followed by short presentations on current industry partner projects, examples of CSB data usage by HOs and habitat mapping projects, and technology perspectives.
- Much discussion on how to expand the initiative into the various maritime sectors, what methodologies were appropriate to incentivise data gathering activities, how the data could be made available and what recognition strategies were desirable.
- Workshop discussions and recommendations will pave the way towards improved private-sector participation in the collection of CSB.



*Hosted by the Canadian Hydrographic Service, Quebec City, Canada, on **12-13, February 2019***



CSB Working Group 7th Meeting

- Chair (Jennifer Jencks, USA) and Vice-Chair (Serge Gosselin, Canada) of CSBWG
- Representatives from eight Member States
 - Canada, Denmark, India, Italy, New Zealand, Norway, UK and USA
- Observers and expert contributors from tONE Data Technology Co, Dongseo University, Farsounder INC, Da Gamma Maritime Ltd, GMATEK Inc, and Fugro.
- Assistant Director David Wyatt represented the IHO Secretariat

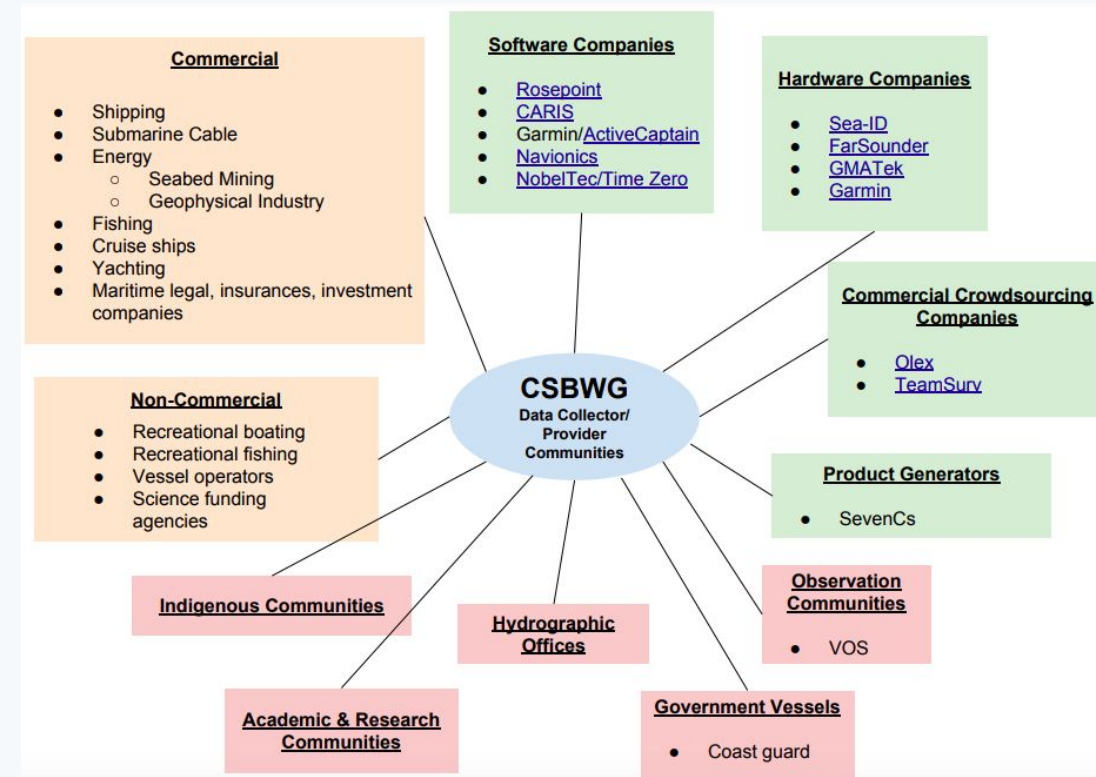


Hosted by the Canadian Hydrographic Service, Quebec City, Canada, on 13-14, February 2019



CSB Working Group 7th Meeting

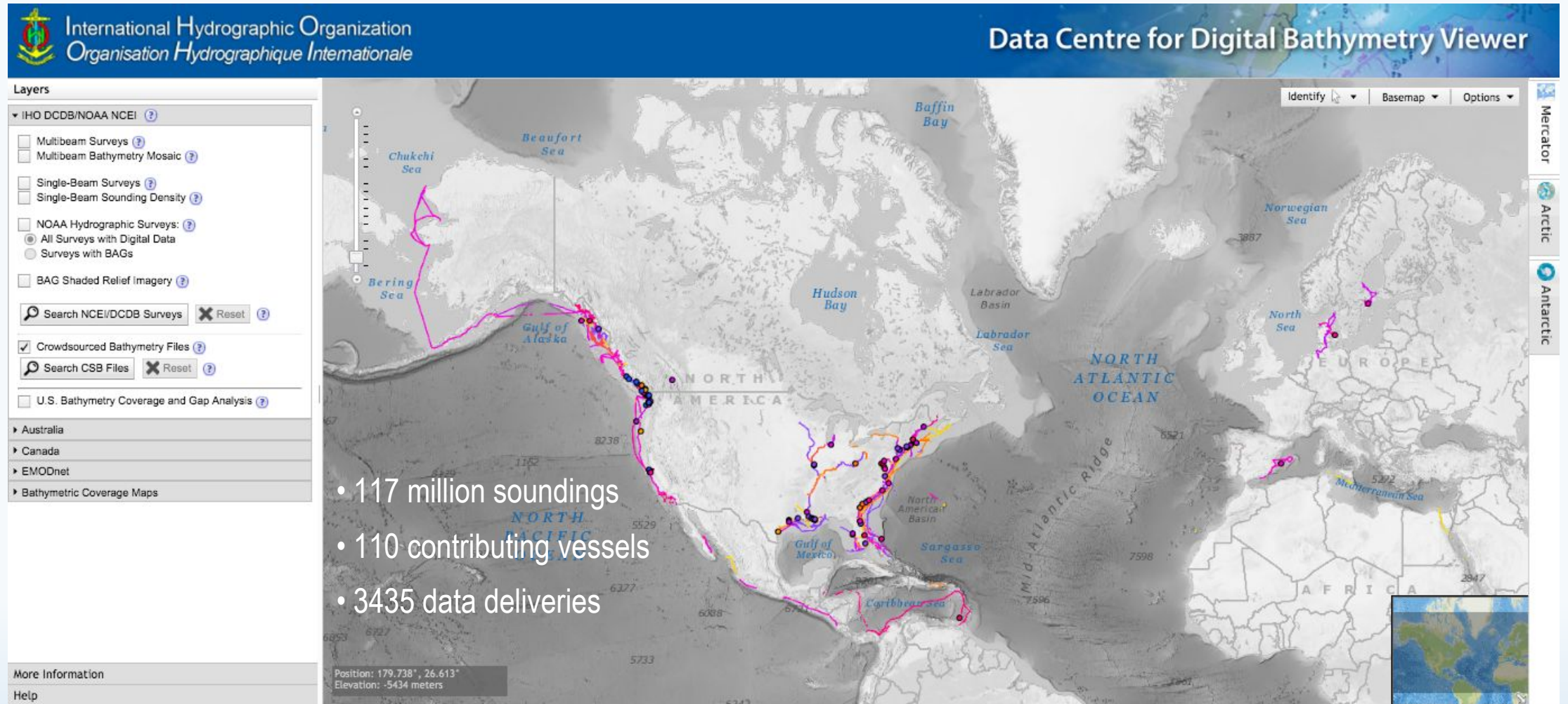
- Agreed that representation at events & meetings will be essential to raise awareness & progress the five headline topics (need, how, what, incentives and benefits) to increase contributions & participation.
- Current outreach strategies will focus on the Geophysical, Research Vessel, Cruise Liner, Submarine Cable, & Recreational Leisure sectors. Leading organizations & companies within each sector to be identified & approached to act as CSB ambassadors.
 - Cruise Liner: Carnival and MacGregor
 - Marine Survey: Fugro
 - Seismic Survey: PGS
 - Research Vessel: Antarctic Treaty Consultative Meeting
- Closer liaison with various IHO bodies, groups/organizations, & projects still needs to take place (eg: DQWG, MSDIWG, Seabed 2030)



Hosted by the Canadian Hydrographic Service, Quebec City, Canada, on 13-14, February 2019



IHO DCDB Database



CSB Use Cases - Hydrographic Offices

Example 1: Citizen Science for Climate Change and Biodiversity Observations

Example 2: Ocean Microbiome and Microplastics Tracking by Citizen Oceanographers

Example 3: Encouraging Innovative Supplementary Data Gathering: An International Hydrographic Organization Crowdsourced Bathymetry Initiative

Example 4: 50,000 Citizen-Science Collected GPS Flood Extents Used to Validate a Street-Level Hydrodynamic Model Forecast of the 2017 King Tide in Hampton Roads, VA

Example 5: Citizen Scientists: An Underutilized Resource for the United States IOOS

Citizen-Science for the Future: Advisory Case Studies From Around the Globe

Christina Simoniello^{1*}, Jennifer Jencks², Federico M. Lauro^{3,4,5}, Jon Derek Loftis⁶, Jan Marcin Weslawski⁷, Kajetan Deja⁷, David R. Forrest⁸, Sarah Gossett⁸, Thomas C. Jeffries^{3,9}, Rachelle M. Jensen³, Shinichi Kobara¹, Lindsey Nolan⁹, Martin Ostrowski^{3,10}, Dana Pounds¹¹, Gabriel Roseman³, Olivia Basco¹², Serge Gosselin¹³, Adam Reed¹⁴, Peter Wills¹⁵ and David Wyatt¹⁶

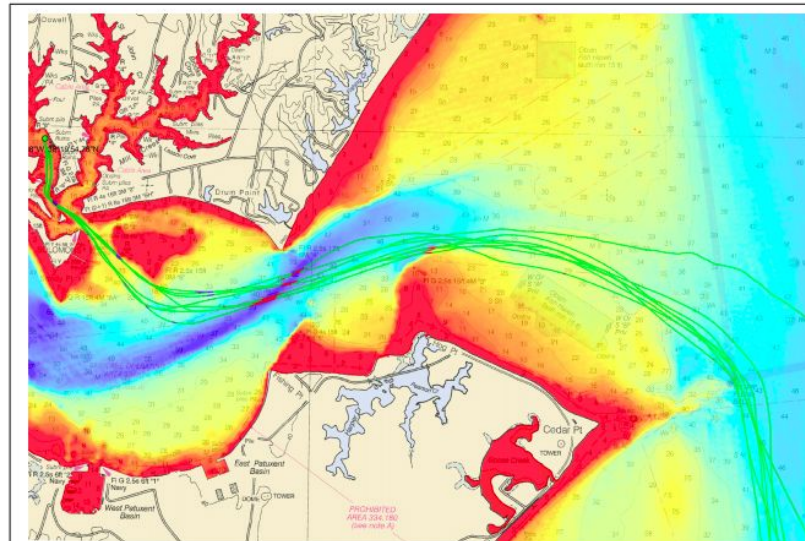


FIGURE 5 | NOAA's Bay Hydro II crowdsourced bathymetry test tracks in green overlaid on multibeam survey data demonstrates how changes can be detected. Image courtesy of NOAA.

Case Study #1: CHS: Inside Passage

- CHS has used CSB to update several IP charts along coastal routes.
- A systematic comparison of charted depths < 10 m yielded improved charted channel depths, data density and improved chart compilation in areas that were surveyed with singlebeam.
- CSB helped prioritize survey areas for the following survey season and initiated the publication of Notices to Mariners.

Case Study #2: NOAA Chart Adequacy Assessment

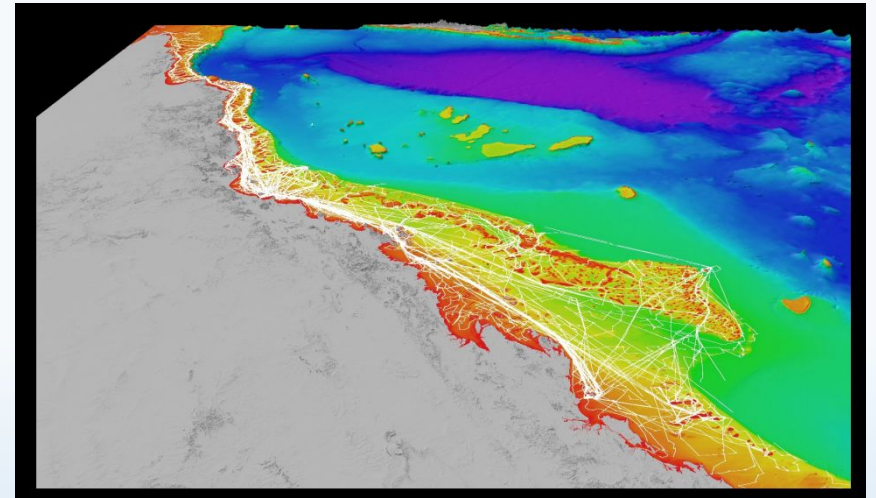
- Describes NOAA & George Mason University collaboration to use CSB to assess NOAA nautical chart adequacy, determine when areas require updated survey information, and identify chart discrepancies before an incident occurs.



Use Case – Great Barrier Reef

- ~40% of GBR shelf is mapped with in situ depth soundings, with a need to preserve, share and fill the data gaps
- Many vessels on the GBR (from expedition dive boats to recreational fishing boats) use some type of echo sounder and GPS for safe navigation and guiding activities
- In 2018, James Cook U. started the 'Crowdsourced Bathymetry on the Great Barrier Reef' project to collect CSB from voluntary vessels
- Partnered with the Great Barrier Reef Foundation to establish a pool of TeamSurv SmartLog USB data loggers.
- This project is also an activity of the Citizens of the Great Barrier Reef, which gives people an increasing role in contributing valuable citizen science data to improve a fundamental dataset that helps the Reef.

SmartLog NMEA data logger + USB

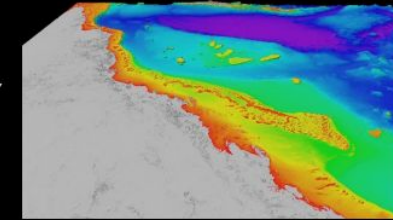


Use Case – Great Barrier Reef

CSB data flow

crowdsourced bathymetry

gbr100/30

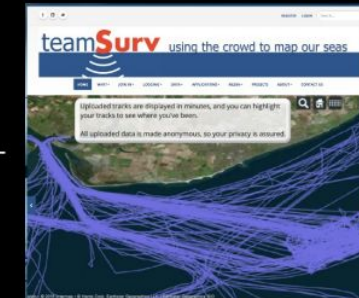


JCU (Trusted Node)

Australian
Hydrographic
Office

IHO Data Centre for Digital
Bathymetry (DCDB)

TeamSurf



Problems Encountered

- There continues to be a need to overcome a degree of skepticism within parts of the IHO community and some sections of the marine domain where an overly cautious focus on potential, although untested, legal issues and concerns on commercial exploitation of data is observed.
 - Increased awareness and information as well as stakeholder engagement/involvement should all help to overcome these reservations.
- There is a growing concern over the apparent lack of dedicated resources available within national HO's to process data available via the DCDB.
 - This is an issue that will need to be addressed for the full benefits of CSB to be realized and will require for HO's to consider engaging efforts and resources, including the development of automated processing, to integrate CSB data into their routines.



Other Items of Note

The continued importance of liaison with other IHO bodies, as well as appropriate engagement with industry to progress the work items, was identified as a key enabler for the project.

It was also noted the significant progress achieved.

There is a need to showcase various use cases of CSB data to indicate the benefits and how MS can utilize the 'free' data for their own national uses.



Actions requested of IRCC

- a) Note the contents of this report;
- b) Encourage IHO Member States to release datasets or subsets into the public domain via the IHO DCDB;
- c) Request IHO Member States state their policy on data gathering restrictions within their maritime areas of jurisdiction, as requested in IHO CL 11/2019, to enable CSB activities to be undertaken;
- d) Request IHO Member States to support the CSB initiative with positive actions, such as requiring all research vessels collect bathymetric data for late uploading, when on passage or when it does not interfere with other research activities;
- e) Request the IHO to support a scaled trial of CSB data collection as a follow on to earlier pilot programmes.
- f) Reappoint the WG to continue its work under the proposed revised ToRs; and
- g) Take what other action is deemed necessary.



Acknowledgements

David Wyatt (Executive secretary)

Serge Gosselin (Vice-Chair)

All the amazing CSB Working Group members

The IHO, GEBCO, SMEs and observers whose contributions are making this possible!

